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WAR DEPARTMENT,

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DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

The present review of atmospheric phenomena during January, 1876, is based upon—

FIRST, the simultaneous observations, charted three times a day at this office for study and the preparation of the published weather predictions.

SECOND, the reports of monthly means and abstracts from four hundred and forty-eight stations, which are classified as Canadian, Naval Hospitals, Army Post Surgeons, Civilian Volunteers, Marine Records and those of the United States Signal Service.

THIRD, manuscript and printed documents and reliable newspaper reports.

The month of January has been marked by the following general features: First, the high barometric pressure in the South Atlantic, Eastern Gulf States and southern California, but low pressure in Oregon and Canada; Second, high temperature, the excess being particularly marked in the Northwest, Ohio valley and Tennessee; Third, an excess of rain from Arkansas northeastward over the Ohio valley.

BAROMETRIC PRESSURE.

In general.—The general distribution of atmospheric pressure during the month is shown by the isobars upon Chart No. II. The pressure has been higher than in January, 1875, in the South Atlantic States: its distribution over the Northwest and Lake region resembles that which prevailed in January, 1874, but differs entirely from that of January, 1875. The pressure in Oregon averages one-tenth below that of January, 1875; but at San Diego is five hundredths above that of January, 1875, which latter month seems, in these respects, to have been quite abnormal. The paths of the areas of high pressure have been somewhat further to the eastward than during December, 1875. The paths of the areas of low barometer resemble, in many respects, those of January, 1875, having all passed the 95° meridian, between the latitudes 38° and 55°, and the 65° meridian, between the latitudes 42° and 55°.

Areas of Low Barometer.—No. I. The origin of this storm, on the 31st of December, was indicated in the review for the month. During the 1st of January, it moved from Missouri to Lake Huron, and thence, on the 2nd, eastward to the St. Lawrence valley; the lowest recorded pressure at its centre was 29.30, and high winds prevailed over Wisconsin, Iowa, Lake Michigan, Indiana, Illinois, Ohio, Kentucky and Tennessee.

No. II. Originated on the 4th in the Southwest. There prevailed during the 3rd on the Pacific coast very low barometer, with rain, in consequence of which air flowing from the north, from British America, caused the pressure to rise over the Upper Lakes and Northwest during the 3rd, but, the air flowing from the south and east over the Gulf States, after causing a slight rise, was followed by a decided fall over the Southwest and Northwest; the central lowest pressure being in the Missouri valley, as the depression

moved northeast and eastward over the Lake region, its elongated outline became more nearly circular. During the 6th, it passed northeastward along the coast of Nova Scotia. This storm was followed by a very extensive area of rather high pressure and clear, cold weather.

No. III. The pressure having fallen on the 5th in Oregon, a low pressure appears on the 7th in Dakota and northward, with northeast and southeast winds from the Missouri river to the Upper Lakes; the depression rapidly developed into a trough, extending, on the morning of the 8th, from Kansas to Lake Superior and beyond, southwest winds, clouds and rain prevailing, as usual, to the south and eastward. By the morning of the 9th, the depression had extended irregularly southwestward and eastward. During the rest of the 9th, the great quantity of air flowing southward to fill up this depression converted it into a well-defined small elongated area, whose centre was, on the afternoon, in southern Michigan, where the lowest pressure was 29.40. At this time, southerly winds and rain prevailed from Louisiana to Lake Huron and New York, but northwest winds and snow from Lake Superior to Illinois. High winds were reported on the 9th from Minnesota, Iowa, Kansas, Lake Michigan, Lake Erie, Illinois, Indiana, Ohio, Kentucky, Tennessee, West Virginia, Pennsylvania and Maine. The storm passed over Lake Ontario and down the St. Lawrence valley, and the subsequent area of high barometer passed southward down the Mississippi valley to the Gulf. A second area of high barometer followed nearly in the same course on the 12th and 13th.

No. IV appears at midnight of the 13th, north of Lake Superior; its path lies along the extreme northern limit of our stations, and is marked only by southerly winds, rain and snow, over the Lake region and the Middle and Eastern States.

No. V. Although the pressure continued high in Oregon and Montana during the 14th, yet it fell decidedly in Dakota, where this storm-area seems to have originated, whence it passed rapidly eastward over the Upper Lakes and Canada to the St. Lawrence valley, and was, on the morning of the 16th, central in Maine. During its progress, cloudy weather, with rain or snow, extended gradually southward, and prevailed during the 15th and 16th, at times, at all stations, except on the South Atlantic coast, where the highest pressure remained.

No. VI and VII. The barometer fell slowly during the 16th in Oregon and eastward, and at midnight area No. VI extended northward into British America from Minnesota, where, as appears usually to be the case under such circumstances, we must place the southern limit of a trough of low pressure. During the 17th, the area of low barometer extended southwestward, and at midnight the axis of the trough stretched from Kansas to Lake Superior and beyond: this extension southwestward appears to have been merely the result of the flow of cold northwest winds towards the Gulf from the plateaus of Colorado, New Mexico and Western Texas, which underran the warm southerly winds then prevailing over Eastern Texas, producing heavy rains during the 16th, 17th and morning of the 18th. During the rest of the 18th, the cold, dry northerly winds having prevailed over the country west of the Mississippi, the barometric trough became a well-defined depression, No. VII, central in lower Michigan, whence it moved slowly north and eastward with steadily diminishing central pressures, reaching New Brunswick on the morning of the 20th, where the lowest pressure, 28.95, was reported. High winds were reported, on the 18th, in Tennessee, West Virginia, Lake Erie, Pennsylvania, New Jersey, Long Island Sound, Rhode Island, Massachusetts and Maine, and continued to a less extent on the 19th.

No. VIII. The high pressure that prevailed on the 19th throughout the Mississippi valley had its maximum in the Gulf States, and a steady flow of air prevailed during the morning of the 20th, from the southeast over Texas, and from the northeast

over the lower Missouri valley. By 4:35 p. m., the temperature had risen rapidly, with a large increase in cloudiness, and diminution of pressure at most stations from southern California eastward to the lower Mississippi, while northerly winds, with snow, prevailed to the northward of this region. During the night the pressure rose rapidly, with falling temperature; cold northerly winds prevailed at the northerly stations, but warm southeast, with rain, in Texas. The irregular area (or more probably trough) of low pressure, which, on the afternoon of the 20th, extended from southern Kansas to central Texas, moved slowly northward, and was, on the morning of the 22nd, a well-defined oval-area central in northern Missouri, while an area of high pressure was central over New England. The storm-centre moved north and then eastward, passing over the north of Lake Erie; was central in Maine the afternoon of the 23rd, and disappeared to the east of Nova Scotia on the morning of the 24th.

No. IX. After the passage of the preceding storm the pressure remained rather evenly distributed over the Lakes and Middle States, but at midnight had begun to fall at the extreme northern stations, and, on the morning of the 25th, the depression No. IX was central north of and near Lake Huron, while southwest winds, clouds and snow, prevailed on the Lower Lakes. This slight depression passed eastward, keeping to the south of Nova Scotia, and perhaps developed after passing beyond the limits of our map.

No. X. The barometer fell on the 25th, slowly in Oregon, but much more rapidly in Dakota and Manitoba, and low barometer, No. X, was central there on the morning of the 26th. The pressure continued, during the 26th, to fall decidedly at the stations in Oregon, Montana and Dakota, while the central depression moved eastward, and was at midnight central north of and near Lake Superior. During the next twenty-four hours this depression passed northeastward beyond our cognizance, giving rise to a subordinate low barometer, central at midnight of the 27th, off the coast of Maine. During the morning of the 27th, southwest winds, clouds and rain or snow prevailed very generally from the eastern Gulf coast to the St. Lawrence valley, while the pressure remained stationary in the South Atlantic States. The steamship City of Limerick passed through the centre of a violent hurricane, (minimum barometer, 28.00; wind ceased from 10:30 p. m., January 27th to 2:30 a. m., January 28th,) in latitude $47\frac{1}{2}^{\circ}$ N., longitude 40° W.

No. XI. The warm, moist southerly winds prevailing throughout the country east of the Rocky Mountains on the 27th, and the southwest winds at the Pacific coast and Rocky Mountain stations, conspire in indicating that the depression, No. XI, was central on the morning of the 27th in Dakota and Montana, where it slowly developed during the rest of the day, and at midnight presents a belt of low barometer, extending from Indian Territory to Dakota, which, on the morning of the 28th, had become an oval area central in northwestern Iowa, whence it moved northeastward over Lake Superior, followed rapidly by northwest gales. At midnight of the 28th, the barometer was 29.20 on Lake Superior and 30.35 in western Minnesota. The central depression moved north and northeastward, and disappeared at midnight of the 29th over the Gulf of St. Lawrence, while an area of high pressure having moved southward, was central in southern Illinois. High winds were reported on the 28th in Minnesota, Missouri, Iowa, Tennessee, Lake Michigan, North Carolina and New Jersey; on the 29th, in Iowa, Michigan, Lake Erie, West Virginia, Maryland, North Carolina, Texas, Long Island Sound, Rhode Island, Massachusetts and Maine.

No. XII. The barometer fell rapidly and rose again on the 29th in Oregon, and was at midnight lowest, apparently, in Montana and Manitoba, the gradient being steep, with high southeast winds in Dakota and Minnesota. On the 30th and 31st, this depression, having moved slowly southeastward, gradually developed into a very much elongated

oval or trough of barometric depression, whose longer axis extended, at midnight of the 31st, from northern Texas northeastward a thousand miles to the Straits of Mackinaw, being bounded on its southeast sides by a high pressure of 30.25 along the Atlantic coast, and on its northwest side by a high pressure of 30.55 in Dakota and Manitoba. The further history of this depression, which, subsequently, developed into a remarkable storm, belongs to the month of February.

Areas of High Barometer.—In general, these have not passed southward over the Mississippi valley so uniformly as was the case during December. The tropical area of highest pressure has, excepting two short intermissions, remained persistently off the South Atlantic coast.

No. I moved on the 3rd of January southward; was, on the morning of the 4th, over the Lake region, and, on the morning of the 5th, over New England, where its highest pressure was attained.

No. II appears on the morning of the 4th in the Southwest, whence it extended eastward, spreading over the Gulf and South Atlantic States, and, on the 7th, joined the area off the South Atlantic coast.

No. III appears, on the 9th, in Dakota, following the rising pressure on the Pacific coast of the preceding day; advanced south and then southeastward, and was, on the morning of the 11th, central over Arkansas and Tennessee. During the next three days, the pressure remained higher throughout the Mississippi valley than over the South Atlantic States; but, on the 14th, the pressure fell at the northern stations and rose at the southern, so that, on the morning of the 15th, the normal condition was again attained: the highest barometer being on the South Atlantic and diminishing thence to the west and northwest.

Nos. IV and V. On the 18th, the low barometer, No. VII, then central in upper Canada, had caused so great a depression throughout the Atlantic States that, on the morning of the 19th, the highest pressure, No. IV, is again found in Texas. During the next twenty-four hours, northerly winds and rising barometer prevailed from the Gulf States to Manitoba. During the 20th, area No. IV moved eastward to the South Atlantic coast, and a second area, No. V, very slowly southward over the Northwest. During the 21st, No. V extended eastward over British America, then southeastward over New England and over North Carolina, joined No. IV, which had remained over the South Atlantic States, leaving low barometer No. VIII to develop in the Missouri valley. On the 22nd, the advance of low barometer, No. VIII, again separated high pressures Nos. IV and V, which, on the morning of the 23rd, were, respectively, central off the South Atlantic and the Nova Scotia coasts.

No. VI formed in the northwest immediately in the rear of high barometer, No. VIII, and extended southward during the 23rd, with steadily increasing pressure in the Northwest. On the morning of the 24th the pressure was generally high, and northerly winds prevailed from the Alleghanies westward to the 100th meridian. The remnant of this area extended, on the afternoon of the 26th, along the Atlantic coast.

No. VIII, followed in the rear of low barometer No. XI; at midnight of the 28th, it extended from Dakota to Kansas; at midnight of the 29th, it was central in Illinois; at midnight of the 30th, it was off the east Atlantic coast. After which it remains as a ridge of high pressure, that extended at midnight of the 31st from Florida to Newfoundland.

TEMPERATURE OF THE AIR.

In general.—The distribution of mean temperatures for the month is shown by the isothermal lines upon Chart No. II. While the average temperature has been slightly below its normal value on the Pacific coast, it appears, in all other sections of the